1-1-2007

Do Suppliers of Third Party Logistics Understand their Customers?

Tim Coltman
University of Wollongong, tcoltman@uow.edu.au

Byron W. Keating
University of Wollongong, byron.keating@gmail.com

Anton Kriz
University of Newcastle

Do Suppliers of Third Party Logistics Understand their Customers?

Abstract

Supply chain management (SCM) research has tended to focus on the planning and management of a broad range of activities involved in sourcing and procurement, conversion, and management of logistics. However, the domain is increasingly recognising the importance of coordination and collaboration between channel partners. As such, there is a need to better understand how channel partners make decisions; and in particular, whether there is an alignment in the expectations of these partners. In this study we use a form of discrete choice analyses to explore the relative importance of various supply chain components for buyers of a third party logistics services. Our research approach overcomes many of the limitations seen in previous studies that rely on simple rankings by survey respondents. The findings suggest that suppliers need to better understand the preference structures of their customers.

Keywords

Suppliers, Third, Party, Logistics, Understand, their, Customers

Disciplines

Physical Sciences and Mathematics

Publication Details

Coltman, T., Keating, B. & Kriz, A. (2007). Do Suppliers of Third Party Logistics Understand their Customers?. Proceedings of the Australian and New Zealand Marketing Academy Conference (pp. 135-146). Dunedin, New Zealand: Australian and New Zealand Marketing Academy.

Do Suppliers of Third Party Logistics Understand their Customers?

Tim Coltman, Byron Keating, University of Wollongong
Anton Kriz, University of Newcastle

Abstract

Supply chain management (SCM) research has tended to focus on the planning and management of a broad range of activities involved in sourcing and procurement, conversion, and management of logistics. However, the domain is increasingly recognising the importance of coordination and collaboration between channel partners. As such, there is a need to better understand how channel partners make decisions; and in particular, whether there is an alignment in the expectations of these partners. In this study we use a form of discrete choice analysis to explore the relative importance of various supply chain components for buyers of a third party logistics services. Our research approach overcomes many of the limitations seen in previous studies that rely on simple rankings by survey respondents. The findings suggest that suppliers need to better understand the preference structures of their customers.

Introduction

The growth of the third-party logistics (3PL) industry has delivered remarkable financial results over the past decade. In 1995 the overall value of logistics costs in the USA was reported to be approximately US$773 billion. In 1996, the 3PL market that formed a focused part of logistic business activities had an estimated value of US$31 billion, and by 2004 this had grown to $US85 billion. Interestingly, the cost of logistics as a percentage of US gross domestic product (GDP) declined over the same period from 10.4% in 1995 to 8.6% in 2004 (Capgemini 2005). Equivalent figures have been reported in Europe (Logistics 2004) and in Australia (DOTARS 2002). These results are due to a combination of factors such as: reduced costs; improved logistics practices and education; technological advances (Peters and Lieb, 2000); and, economies of scale for both the 3PL providers and their customers (Lieb and Miller, 2002).

Given the economic and strategic importance of supply chain activities it will come as no surprise that the selection and purchase of logistics services is a complex process that comprises many parts. Firstly, a company must decide which activities to outsource. Secondly, it must select the most appropriate service provider to perform these activities. To date, the academic and practitioner literature has largely focussed on the ‘build versus outsource’ debate (Clegg *et al.,* 2005) together with commentaries on the positive and negative aspects of relationship(s) between the 3PL provider and their customers (eg Power and Moosa, 2006). Only a small corpus of research has begun to explore the nature of consumer demand in the supply chain industry (Verma *et al.*, 2006), with almost no attention afforded to the important question of whether the suppliers of such services understand the needs of their customers.

This study will explore new ground and open up the ‘black box’ of customer decision making in the supply-chain setting by concentrating on the relative importance of those factors

contributing to the choice of 3PL service providers. More specifically, we shed new light on the attributes considered most important to buyers of 3PL services by using a market utility-based approach that uses a form of discrete choice analysis known as a best-worst experiment. This approach is also replicated with a supplier sample to examine the extent of alignment between buyers and suppliers. The remaining sections of this paper set about developing ratio scales that capture the relative importance of different attributes in the supply chain from both the supplier and buyer perspective, where a strong alignment in the preference structures is hypothesised as indicating a good understanding of customer needs by suppliers.

Methodology

An effective method for evaluating the relative importance that firms place the various supply chain factors is to model consumer preferences as a response to experimentally designed service profiles. This approach, commonly known as discrete choice analysis (DCA), has been used to extensively to model choice preferences of decision makers in a variety of organisational areas spanning marketing, operations management, transportation and economics (Auger *et al*., 2007; Verma *et al*., 2006; Goodale *et al*., 2003). There are a number of different DCA methods that allow a researcher to elicit stated preferences, and contribute to understanding and predicting actual behaviour *in the marketplace*. One relatively simple method that is particularly useful in narrowing down and getting a quick snapshot of preferences is best-worst scaling.

The formal statistical and measurement properties for best-worst scaling can be found in Marley and Louviere (2005). Fundamentally best-worst scaling is an ordering task that requires respondents to make a selection from a group of items by choosing the ‘best’ (most preferred) and ‘worst’ (least preferred) items in a series of blocks of two or more items. The items could be attributes of a product, options in a decision, or bundles of services and products. The approach is particularly effective in creating a preference ordering for a list of items when the number of items is large, as individuals are better able to determine which two of a group of items are ‘best’ and ‘worst’ than they are at performing a specific ordering (ie. 1, 2, 3,…, 21). Best-worst scaling has the added benefit that it is quick and simple to execute, provides results that are empirically consistent with more complex ordering tasks and theoretically in line with the principles of random utility theory.

Best-worst scaling applies experimental design techniques that allow us to discern the utility associated with an attribute without having to consider every possible combination of alternatives. A fractional factorial design was used to ensure that each possible attribute pair (available to be chosen) is displayed the same number of times; in other words, the design is fully balanced (Burgess and Street, 2004). This design ensured that the statistical requirement of orthogonality for each attribute was maintained, resulting in an orthogonal main effects design (OMEP) with all possible subsets of choices given by 2^5 factorial.

In this study, the intent is to determine the relative importance of the factors that drive the decision to purchase logistics services from a 3PL provider. This allows us to reduce a relatively large number of attributes associated with the decision (N=21) down to a manageable number of important issues that can be scrutinized in more detail using other methods.

Findings

One hundred and seventy one middle-to-senior managers participated in the study — seventy-five from an international 3PL supplier and ninety-six buyers of 3PL services. A detailed assessment of the ranked (best-worst) order for all 21 attributes was conducted both respondent groups. The results were separated into two frequency distributions according to the number of times the attribute was selected by respondents. The simple rank order results are presented in Table 1 for both suppliers and buyers.

Table 1: Ranked Results From 'Best-Worst' Experiment

	Suppliers				Buyers			
Attribute	Best	Worst	BW Score	Rank	Best	Worst	BW Score	Rank
Reliable performance	240	3	3.653	1	333	2	3.821	1
Customer services recovery	107	11	2.467	2	97	32	1.613	7
Customer service support	81	9	2.408	3	151	24	2.136	4
Supply chain flexibility	127	24	2.006	4	162	33	1.950	5
Professionalism	70	18	1.783	5	138	12	2.594	3
Delivery speed	76	21	1.733	6	211	17	2.650	2
Global network	92	30	1.620	7	73	66	1.045	10
Supply chain capacity	82	37	1.415	8	88	53	1.249	8
Parity price	98	48	1.366	9	77	114	0.841	12
Track and Trace	56	33	1.261	10	143	36	1.798	6
Account representative presence	46	28	1.244	11	47	91	0.749	14
Proactive innovation	87	70	1.101	12	119	75	1.225	9
Relationship orientation	51	71	0.864	13	80	95	0.927	11
Risk management	24	50	0.726	14	42	67	0.814	13
Billing service	21	69	0.600	15	33	138	0.545	16
Management reporting	25	97	0.561	16	34	153	0.530	17
Top management team availability	19	120	0.468	17	30	183	0.473	18
Surcharge option	19	140	0.443	18	12	245	0.333	21
Brand	23	171	0.442	19	14	236	0.348	20
Quality certification	17	146	0.421	20	22	171	0.435	19
Culture	14	179	0.374	21	45	108	0.683	15

The 'best' column illustrates the frequency that the particular attribute was ranked 'best' or matters 'most' to respondents from the attribute group. For example, the top scoring attribute for both groups when considering selection of the feature that matters 'most' was *reliable*

performance (selected 333 times for the buyers and 240 times for suppliers); the lowest scoring attributes were *surcharge option* for suppliers (selected 12 times) and *culture* for buyers (selected 14 times). The 'worst' column shows the frequency that an attribute was selected as the 'least' important feature by respondents. This column is read in the opposite way to the 'Best' column - the attribute selected the least number of times as 'least important', was *reliable performance* (selected 2 times by buyers and 3 times by suppliers) out of the set of 21 options; indicating that it is actually considered to be one of the more important features. It is worth noting that the attributes in this column appear to be almost perfect reciprocals of the 'Best' column, implying consistency in the decisions (or selection of features as 'most' or 'least' important) made by the respondents.

The frequencies of the selected 'Best' and 'Worst' responses provide a complete ordering from the highest to lowest ranked attribute. The utilities for each attribute were calculated using a best-worst score (sometimes referred to as a 'maximum difference' scale) that is simply the square root (SQRT) of the 'weighted best' score divided by the 'weighted worst' score based on the mathematical proofs provided by Marley and Louviere (2005). The values for both 'weighted best' and 'weighted worst' were easily obtained by creating a score based on the possible subsets of ranked choices for each set. For example, in the case of a 5 attribute set the weights for each choice are as follows: choice 1 (best) = 16, choice 2 = 8, choice 3 = 4, choice 4 =2 and choice 5 (worst) = 1. This weighting process is in accord with the ranking theorem proposed by Luce and Suppes (1965). In this study only two weights were used: the best (choice 1 = 16) and the worst (choice 5 = 1), as respondents selected only the 'best' and 'worst' attribute in each group. Figure 1 plots the best-worst score as an easy-to-interpret graphical representation of attribute preferences for both respondent groups.

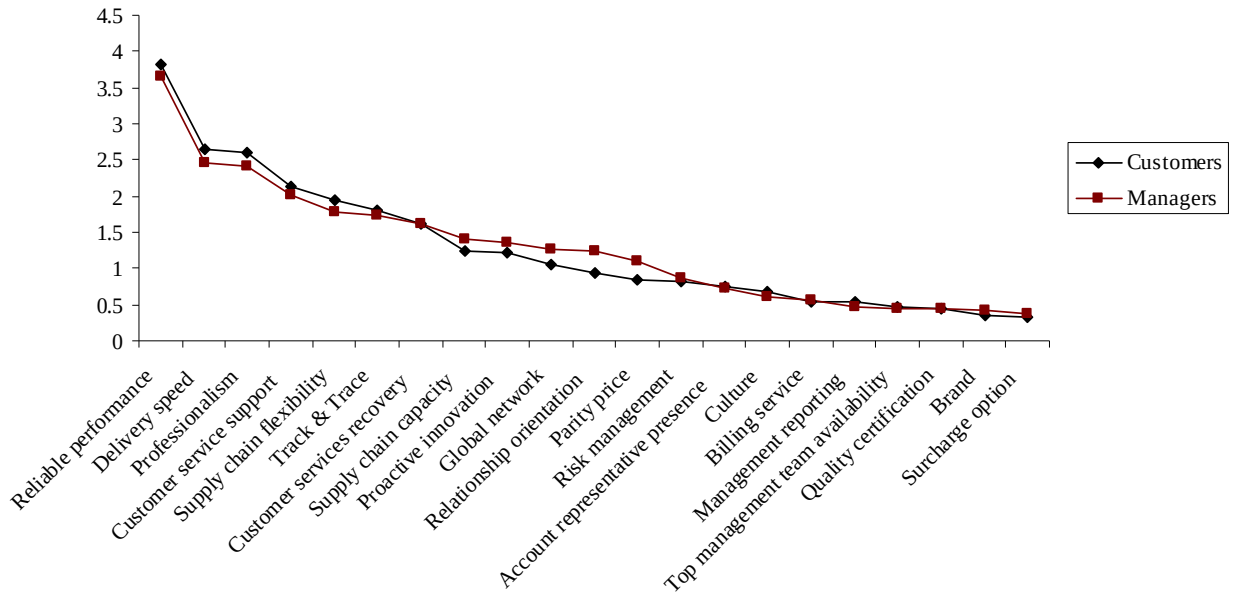

Figure 1: Attribute Importance in Descending Order

From figure 1 it can be seen that the attributes fall into three groups. The graph shows that buyers and suppliers are closely aligned in terms of what they value least. That is, suppliers seem to understand that their customers place little value on bottom nine attributes (ie. surcharge option, branding, certification, top management availability, management reporting, billing service, culture, account representative presence and risk management). However, the

figure also demonstrates that suppliers tend to under-value those attributes considered most important to customers (ie. reliable performance, delivery speed, professionalism, customer service support, supply chain flexibility, track and trace); and over-value the middle set of attributes (ie. supply chain capacity, proactive innovation, global network, relationship orientation and parity price). Both groups value customer service recovery as being of mid-level importance.

Conclusions

Traditionally supply chain research has been dominated by investigations of functional components, such as facilities location and transportation (Geoffrion and Powers, 1995), inventory management (Cohen and Lee, 1998), materials management, purchasing and distribution (Turner, 1993). This explicitly assumes that the decision criteria are functional and related to those aspects of the choice that matter to the direct cost or efficiency of the supply chain. In this study we have taken a different approach and asked 'What factors matter to the decision makers when choosing a supply chain provider?' This reveals that although performance measures such as reliability, delivery speed, flexibility and capacity are important, they are not the only factors that matter to the customer. Our results highlight the various performance and relational capabilities that matter in the choice of a 3PL provider; and most significantly, the extent to which they matter *relative to one another*.

Despite great advances in the performance of logistics activities the industry has come under new cost pressures due to factors such as increased fuel prices, interest rates and larger inventories. Not surprisingly, 3PL companies are re-evaluating their strategic responses and planning activities to evaluate the relative importance of factors other than price and price sensitivity. The findings reported here support Gattorna's claim (2006) that the secret to designing an effective supply chain is to start by understanding the needs and preferences of 'customers' and then reverse engineer business processes, company culture and leadership to support the requirements of the market.

Further, a growing body of research exists to suggest that binary ('best-worst' or 'yes-no' or 'least-most') responses are simple and reliable estimates of customer demand. It is cognitively easy for respondents to indicate that 'I prefer A' or 'I do not like B' and 'I think A is the most important attribute, and B is the least important attribute in the set of {A B C D E}'. Furthermore, the approach is scale free and avoids problems that commonly arise in traditional research where respondents are required to rate attributes according to a set scale (e.g., 1 to 5 or 1 to 7). The problem with traditional likert scales is that the scores can mean different things to different respondents. Additionally, respondents often suffer from biases such as 'yea-saying', 'nay-saying' and 'middle of the road'. The best-worst scaling procedure used in this study forces the respondent to select items of relative importance through trade-offs and therefore provides data that is scale free.

In summary, this study has provided greater understanding of what attributes are considered important to customers of a 3PL service provider. While suppliers can do more to understand their customers, the findings of this study provide valuable clues as to where suppliers should be focusing their attention; and importantly, areas in which resource allocations can be re-evaluated. The next stage of this research is to extend on this approach to address the issue of *how* people choose within an option. This will require identification of different levels for

each attribute so that respondents can evaluate preferences in line with more traditional choice modelling research.

References

Auger, P., Devinney, T.M., Louviere, J.J., 2007. Using best-worst scaling methodology to investigate consumer ethical beliefs across countries. Journal of Business Ethics 70 (3), 299-227.

Burgess, L., Street, D.J., 2004. Optimal Designs for Asymmetric Choice Experiments. CenSoC Working Paper No. 04–004.

Capgemini, 2005. Third Party Logistics: Results and Findings of the 10th Annual Study, October 25.

Clegg, S.R., Burdon S., Nikolova, N., 2005. The Outsourcing Debate: Theories and Findings. Journal of the Australian and New Zealand Academy of Management 11 (2), 37–53.

Cohen, M.A., Lee, H.L., 1998. Strategic Analysis of Integrated Production–Distribution Systems: Models and Methods. Operations Research 3 (2), 216–228.

DOTARS, 2002. Freight Logistics in Australia: an Agenda for Action. DOTARS Freight Logistics Industry, Commonwealth of Australia.

Gattorna, J.L., 2006., Living Supply Chains, FT Prentice Hall, Edinburgh Gate, UK.

Geoffrion, A.M., Powers, R.F. 1995. Twenty Years of Strategic Distribution System Design: An Evolutionary Perspective. Interfaces 25 (5), 105–127.

Goodale, J., Verma, R., Pullman, M.E., 2003. A Market Utility–Based Model for Capacity Scheduling in Mass Services. Production and Operations Management, Summer 12 (2), 165-185.

Lieb, R., Miller, J. 2002. The use of Third–party Logistics Services by Large US Manufacturers, The 2000 Survey. International Journal of Logistics: Research and Applications 5 (1), 1-12.

Logistics, 2004. Logistics in France. Invest in France Agency, available from www.logistics–in–europe.com, accessed 2 June 2007.

Luce, R.D., Suppes, P. 1965. Preferences, utility and subject probability. In: Luce, R.D. *et al*. (Eds.), Handbook of Mathematical Psychology, Wiley, NY.

Marley, A.A., Louviere, J.J. 2005. Some Probabilistic Models of Best, Worst and Best–Worst Choices. Journal of Mathematical Psychology 49 (6), 464–480.

Peters, M., Lieb,R. 2000. Perspectives of the Current Status and Future Prospects of Third–party Logistics (3PL) Industry in Europe – 1999 Survey. Cranfield and Northwestern University.

Power, D., Moosa, S. 2006. 3PL Service Provision in Australia: Perception and Expectations of Providers and Customers' Research Report. Department of Management, University of Melbourne, March.

Turner, J.R., 1993. Integrated Supply–Chain Management: What's Wrong with This Picture. Industrial Engineering 25 (12), 52–55.

Verma R., Louviere J.J., Burke, P., 2006. Using a Market Utility Based Approach to Designing Public Services: A Case Illustration from United States Forest Service. Journal of Operations Management 24 (4): 407–416.